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THE EFFECT OF PERCEIVED SERVICE QUALITY, PERCEIVED SACRIFICE, AND PERCEIVED SERVICE OUTCOME ON ONLINE CUSTOMER LOYALTY

Completed Research Paper

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Abstract

Customer loyalty is a key driver of financial performance in service organizations. We investigate whether or not online customer loyalty can be increased through enhancing the perceived service quality, reducing perceived sacrifice and improving the perceived service outcome in the online service context with the possible availability of live help service technology. We also investigate the moderating role of customer product knowledge on these relationships. The empirical results indicate that 1) online customer loyalty increases with higher perceived service quality, lower perceived sacrifice and better perceived service outcome, 2) perceived service quality positively influences perceived service outcome while perceived sacrifice negatively influences perceived service outcome, 3) customer product knowledge negatively moderates the relationship between perceived service quality and online customer loyalty such that greater product knowledge weakens that relationship, 4) customer product knowledge positively moderates the relationship between perceived sacrifice and online customer loyalty. Theoretical and practical implications are discussed.

Keywords: Perceived service quality, perceived sacrifice, perceived service outcome, customer product knowledge, live help service technology, online customer loyalty.

THE EFFECT OF PERCEIVED SERVICE QUALITY, PERCEIVED SACRIFICE, AND PERCEIVED SERVICE OUTCOME ON ONLINE CUSTOMER LOYALTY

Introduction

Customer loyalty is a key driver of financial performance in service organisations (Ganesh et al. 2000; Jones and Sasser 1995; Reichheld and Teal 1996). Customer loyalty may be a more important determinant of profit than market share and position (Heskett et al. 1994). Loyal customers are also more inclined to recommend the vendor to other customers, increasing the customer base at no additional advertising expense (Heskett et al. 1994; Reichheld and Sasser 1990; Zeithaml et al. 1996). Customer loyalty is regarded as an even more prominent factor in the survival of online businesses because recommendations and support from loyal customers can be spread faster online as compared to offline (Reichheld and Schefter 2000). An increasing body of IS research has recognized the importance of online customer loyalty, as it is an important predictor of customer behavior in online service settings (Gefen 2002; Kim and Son 2009; Park and Kim 2006; Thatcher and George 2004). By identifying the key factors leading to online customer loyalty and understanding the relative impact of these factors, practitioners can better design online service technologies to enhance these factors to achieve higher levels of customer loyalty.

Previous research suggests that customer loyalty is based primarily on perceived service quality (Gefen 2002; Heskett et al. 1994; Reichheld and Sasser 1990; Reichheld and Schefter 2000). The study of the effect of service quality on customer loyalty is relevant to IS research, as E-business has shifted the focus of information technology (IT) utilization from internal management tools to customer-directed applications (Straub and Watson 2001), and it has compelled a dramatic expansion of IT into the provision of all types of customer service (Bitner et al. 2000). Consequently, the deployment of IT is characterized not only by technical issues but by service quality issues as well (DeLone and McLean, 2003; Ding and Straub 2008; Koufaris 2002). Since IT provides a medium for the delivery of e-service—for example, through a retail Web site (Gefen 2002; Koufaris 2002)—it is as subject to service quality assessments by its customers as any other service provider.

However, little research has been conducted to investigate how perceived service quality and perceived sacrifice together influence online customer loyalty, where perceived sacrifice is defined as that which is given up or sacrificed to acquire a service (Brady et al. 2005; Dodds et al. 1991; Heskett et al. 1990; Zeithaml 1988). Customers do not always choose the highest-quality service (Olshavsky 1985) since greater sacrifice might be required to obtain better service quality. The concept of perceived sacrifice is particularly important to the IS domain as more and more companies implement self-service technologies (e.g., kiosk, Internet) and require the participation of customers in order to shift part of the work of providing service to the customers themselves as means of increasing productivity and reducing costs.

In addition, while perceived service quality and perceived sacrifice capture the service process, it is also important to consider the service outcome that is a consequent of the service process (Brown and Swartz 1989; Grönroos 1984). Although a few studies (e.g. Bell et al. 2005) have considered the impact of service quality and service outcome on *offline* customer loyalty, perceived sacrifice has not been considered and it is not clear whether past results will hold in the online environment, particularly in those websites equipped with service technologies (e.g., live help). Accordingly, the first objective of our study is to examine how the service process (captured by perceived service quality and perceived sacrifice) and service outcome together contribute to creating online loyal customers.

The second objective of our study is to test moderators of the main relationships among the three service attributes to further understand under what circumstances perceived service quality, perceived sacrifice and perceived service outcome predict online customer loyalty. Consistent with the notion that it is meaningful to investigate the moderating effects of customer traits in the service environment (Dabholkar and Bagozzi 2002), we investigate the moderating effect of customer product knowledge, and expect that the perceptions of the relative importance of the three service attributes will vary for customers with various degrees of product knowledge.

Although a few studies have examined the effect of service quality in the online environment without a human service agent (e.g. Gefen 2002), we advance the literature by incorporating the role of having a human service agent on a website through the implementation of *live help* service technology. Through the live help service technology (e.g., as in Dell.com), customers can interact directly with human customer service representatives using an online medium (Aberg and Shahmehri 2003). This is becoming a more common means of online service provision. Towards having a manageable scope, we focus our attention on the requirement and specification service stage of the Customer Service Life Cycle (CSLC). The CSLC is a framework that describes the series of interactions that take place between customer and vendor before, during, and/or after the core purchase, including a customer's initial learning of a product, acquisition and ownership of the product, and finally disposal or replacement of the product. IT is an important resource toward providing services to augment and add value to a core product or service transaction across all of the interactions the CSLC describes (Cenfetelli et al. 2008; Ives and Mason 1990). The *requirement and specification* service stage of the CSLC describes those activities in which customers ascertain their product needs as well as which product and product features are most appropriate for them.

In the next section, we review the literatures on social exchange theory, service process, and service outcome. We then develop the hypotheses, describe the research method, and present the analysis of results. We finally conclude the paper by discussing the theoretical and practical implications and limitations as well as suggestions for future research.

Literature Review

Social Exchange Theory and Customer loyalty

The key notion of *social exchange theory* is that human behavior is in essence an exchange particularly of rewards (Homans 1961). Exchange represents the basis of human behavior (Homans 1961) and is pervasive throughout social life (Coleman 1990). Exchange theory posits that individuals provide one another with mutual gratifications to sustain social relations (Zafirovski 2003). Applying the theory to our context, customer loyalty is a behavioral intention such that customers desire to do more business with the vendor and to recommend that vendor to other customers (Zeithaml et al. 1996). From the online vendor's perspective, increasing customer loyalty is an economic necessity given the relatively long period between repeat purchases and the need to recoup the average initial cost of attracting the customer to the website (Gefen 2002; Reichheld and Schefter 2000). Achieving customer loyalty is one of the most important goals for vendors. If customers experience high service quality, less sacrifice, and better service outcomes in using the service, they will reciprocate by recommending the vendor to others and continue their relationship with it.

Service Process and Service Outcome

It has long been recognized that services have both process and outcome components (Bell et al. 2005; Brown and Swartz 1989; Grönroos 1984). Mohr and Bitner (1995) define service outcome as "what a customer receives during the exchange" and service process as "the manner in which the outcome is transferred to the customer." The overall service evaluations a customer makes toward a vendor are related to both service process and service outcome (Dabholkar and Overby 2005; Zeithaml et al. 1990). For example, Johnson et al. (1998) found that both service outcome and service process influence service referral, though the influence of service process is more significant. On the other hand, Dabholkar and Walls (1999) found that both process and outcome factors are linked to service evaluation and switching behavior, but service outcome is always more important. Others have observed that process and outcome are equally important (Richard and Allaway 1993). Although there are slight differences in these studies, all suggest that it is essential to examine both service outcome and service process.

Service Quality and Sacrifice

Two constructs of service process are relevant to the context of our study: perceived service quality and perceived sacrifice. In the service and marketing literatures, there is a fairly wide acceptance of a natural link between service quality evaluations and process factors and the importance of examining the sacrifice during the service process

(Dabholkar and Overby 2005; Parasuraman et al. 1988; Sampson and Froehle 2006; Zeithaml 1988). The separation of perceived service quality and perceived sacrifice is consistent with the cost-benefit paradigm from behavioral decision theory (Beach and Mitchell, 1978; Payne, 1982) and the concept of value in the service literature that defines value as the trade-off between gains and losses (Sirohi et al. 1998; Brady et al. 2005).

Perceived service quality is the overall customer evaluations and judgments made regarding the excellence and quality of service delivery (Santos 2003). Perceived service quality has been a long-standing and highly relevant construct with respect to customer service situations (Dabholkar and Overby 2005; Grönroos 1998; Johnston 1995; Parasuraman et al. 1985, 1988). Although typically applied to traditional offline contexts, it is also important for firms to provide service quality using technology (Bitner 2001; DeLone and McLean 2003; Ding and Straub 2008; Zeithaml et al. 2002). Although technology has profoundly changed the ways in which companies interact with and serve their customers, customer desires for quality service do not show any signs of changing (Bitner 2001). Service quality is a vital component of any organization's success in the Internet age (Song 2003; Yang 2001).

In addition to perceived service quality, perceived sacrifice is another construct particularly relevant to the context of our study. Sacrifice includes both monetary and nonmonetary costs of obtaining and using a service, such as effort and time (Zeithaml 1988). It is particularly relevant in the online environment where customers are coproducers of the services they receive. The concept of sacrifice has also been recognized in IS (e.g., Liang and Huang 1998; Mantei and Teorey 1988; Kim and Son 2009), though surprisingly very few studies have taken both perceived service quality and perceived sacrifice into account as antecedents of online customer loyalty. Interestingly, one of the most commonly used service quality instruments, SERVQUAL (Parasuraman et al. 1988), does not explicitly include any perceived sacrifice items. To obtain a more balanced view of how customers become loyal to online vendors, this study measures both perceived service quality and perceived sacrifice.

In summary, to understand how online customer loyalty is created, both service process and service outcome should be taken into account. To evaluate service process, we should evaluate not only the "gain" side (e.g., service quality) but also the "loss" side (e.g., sacrifice) in order to form a complete picture. That is, customer loyalty can be achieved by improving perceived service quality, reducing perceived sacrifice, and creating better perceived service outcome.

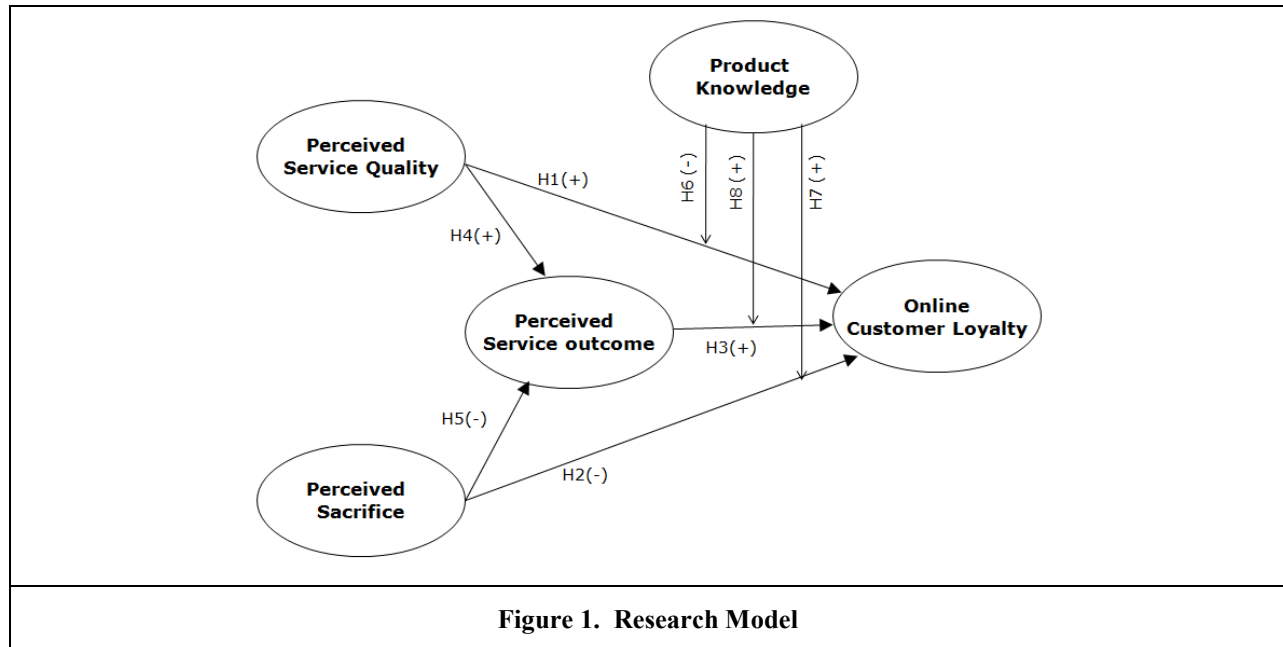
Research Model and Hypothesis Development

We investigate the effectiveness and the relative importance of perceived service quality, perceived sacrifice and perceived service outcome on creating online customer loyalty, and the moderating role of customer product knowledge. The entire research model is shown in Figure 1.

In order to build and sustain a competitive edge, service organizations need to strive to maintain a superior quality of service in an effort to gain customer loyalty, hence improving customer retention rates (Kandampully 1998). Research shows that service quality leads to customer loyalty and attraction of new customers (Berry et al. 1989; Boulding et al. 1993; Wong and Sohal 2003; Zeithaml et al. 1996). In an online context, Gefen (2002) found that service quality leads to customer loyalty. Because quality service is desired by customers, based on social exchange theory, providing high quality service should increase their willingness to return and to conduct more business with the vendor. Customers who experience low service quality tend to have unfavourable behavioural intentions (Olorunniwo et al. 2006). Thus, we posit:

Hypothesis 1: Perceived service quality has a positive effect on online customer loyalty.

It has been argued that the presence of customers' inputs (e.g. information) distinguish production process from service process (Sampson and Froehle 2006). For example, to obtain product advice service from a live help service, customers need to first provide their product preferences as information, which requires a certain degree of time and effort sacrifice, in addition to the sacrifice to wait for the response from the live help and the sacrifice to evaluate the products. During this social exchange, the live help service relies on the customers to explain exactly what they want. Conversely, the customer is dependent on live help to execute his or her requests to create a successful exchange.



If unnecessary sacrifice is made by customers during the exchange, customer loyalty will be negatively affected. If vendors can help customers reduce their sacrifice perceptions without compromising service quality, we believe that customers are more likely to be loyal. On one hand, shortcomings in service quality (such as, lack of care) may be offset by perceived reduction in sacrifices (e.g., time, effort, and price). On the other, some customers might not desire the highest service quality if it requires them to sacrifice more time and effort to achieve it (Olshavsky 1985). Consequently, we posit:

Hypothesis 2: Perceived sacrifice has a negative effect on online customer loyalty.

In the requirement and specification stage of the CSLC, the final service outcome is the product choice made by the customer. Thus, the perception of the service outcome is customer's overall evaluation of his or her product choice. This notion of considering product as service outcome is consistent with the service and marketing literatures (Clow and Beisel 1995; Bean et al. 1996). Applying social exchange theory, if customers perceive the service outcome is unfavourable, they might withdraw from the service exchange. In contrast, if customers have a good impression about the service outcome, they are expected to broadcast the benefits they have gained to others and be more loyal to the service provider. Thus, we posit:

Hypothesis 3: Perceived service outcome has a positive effect on online customer loyalty.

The preceding hypotheses investigate the effects of perceived service quality, sacrifice and service outcome on customer loyalty, we now present our rationale for why the two service process variables (perceived service quality and perceived sacrifice) should influence perceived service outcome¹. Service outcome has been considered to be closely associated with emotion (Dabholkar and Walls 1999; Johnson et al.1998), while evaluations of service process are mostly based on cognitions (Oliver 1997; Parasuraman et al. 1988). Under normal conditions (vs. extreme ones), customers will evaluate the service more rationally and cognitively followed by an overall, global, affective evaluation based on these cognitions (Dabholkar and Overby 2005). Dabholkar and Overby investigated real estate agent service and found that service process influences service outcome. In the current study context, what customers receive as service is advice. As this kind of service is intangible, customers will rely on the evaluation of the service process to form the perception of service outcome (Grönroos 1998). That is, when customers perceive that the merchants sincerely show assurance and empathy and/or competently help customers to reduce their effort and time throughout the service process, customers will be more likely to perceive the service outcome more favorably. Thus, we posit:

¹ We are thankful to an anonymous reviewer for suggesting these two linkages.

Hypothesis 4: Perceived service quality has a positive effect on perceived service outcome.

Hypothesis 5: Perceived sacrifice has a negative effect on perceived service outcome.

All vendors deal with a degree of customer heterogeneity and one of the key differences among customers is the degree of knowledge a given customer has about the product being sold. Customers with high product knowledge are expected to be better able to evaluate the service outcome (Bell et al. 2005) and be more efficient at processing information (Eisingerich and Bell 2008) to achieve their online shopping goal. Thus, for those with high product knowledge, service outcome and sacrifice will carry more weight in influencing loyalty towards the online service provider, with a corresponding decrease in the importance of service quality. On the other hand, customers with less product knowledge will more appreciate the service quality provided by the website, as they cannot fully rely on their own product knowledge to finish the online shopping task, and might instead rely on relational and tangible cues characteristic of service quality to form their product evaluation (Sharma and Patterson 2000). The relative importance of the sacrifice perception will decline as customers may take more time to interpret product information. In addition, due to the lack of product knowledge, customers may have difficulty assessing the service outcome and thus less certainty in evaluating that outcome. Thus, the link from perceived service outcome to loyalty should not be as strong as for those with high product knowledge. Hence, we hypothesize:

Hypothesis 6: Customer product knowledge has a negative moderating effect on the association between perceived service quality and online customer loyalty.

Hypothesis 7: Customer product knowledge has a positive moderating effect on the association between perceived sacrifice and online customer loyalty.

Hypothesis 8: Customer product knowledge has a positive moderating effect on the association between perceived service outcome and online customer loyalty.

In summary, Hypotheses H1 through H3 depict how service process and service outcome influence online customer loyalty (main effects), with H1 and H2 denoting a service process (based on perceived service quality and perceived sacrifice) and H3 representing perceived service outcome. Hypotheses H4 and H5 depict the interrelationship between service process and service outcome. Hypotheses 6 through H8 represent the moderating effects of customer product knowledge on the H1 to H3. Empirical testing of these hypotheses is described in the next section.

Research Method

Study Setting

The primary objective of this paper is to conduct an investigation of the impact of service process and service outcome on online customer loyalty, and the interaction between service process and service outcome. In practice, there is more than one specific Web interface design that can improve service process and service outcome. Hence, the analysis conducted in this paper focus less on specific designs, but more on understanding the influence of service process and service outcome that can be implemented via different designs.

We utilized websites that would represent the range of variance that is possible when designing sites with different levels of service process and service outcome. Therefore, we tested the research model in an experiment involving websites that used different service technology conditions²: (1) a simple comparison matrix that provides an overview of product alternatives and attributes, (2) a software recommendation service technology in addition to

² The comparison matrix condition provides a convenient summary of the product information, with rows displaying product attributes and columns displaying product models. In the software recommendation service treatment, based on the task description, subjects utilized the service by indicating their preferences regarding the product attributes and the weights assigned to the attributes. The software then ranked the products based on the customer's indicated preferences and presented the top five product recommendations accordingly. In the live help service treatment, the subjects indicated their product preferences to the live help. The live help assistant, unbeknownst to the customer, has access to the same software as in the software recommendation service treatment. The live help assistant then inputted the customer's product preferences to the software, and then presented the top five recommendations generated by the software to the customer.

comparison matrix (3) a text-based live help service technology in addition to the matrix, and (4) a hybrid of these two latter technologies that combines the live help service with the software recommendation service technology, in addition to the matrix. It should be noted that live help service technology is not available in the first two conditions, while it is in the latter two conditions. The different live-help service groups provide an appropriate environment with service variants that range from a low level of service (i.e. without live help) to a high level of service (i.e. with live help). Such a setting should be able to create an adequate amount of variance in the measured variables in order to test the research model adequately and evaluate the relative importance of the service quality, sacrifice and service outcome. All of the subjects used a fictitious website. Except the treatments difference, all other information in the website was kept constant across conditions. Figure 2 is the screen capture for the experimental Web site with the live help service technology.

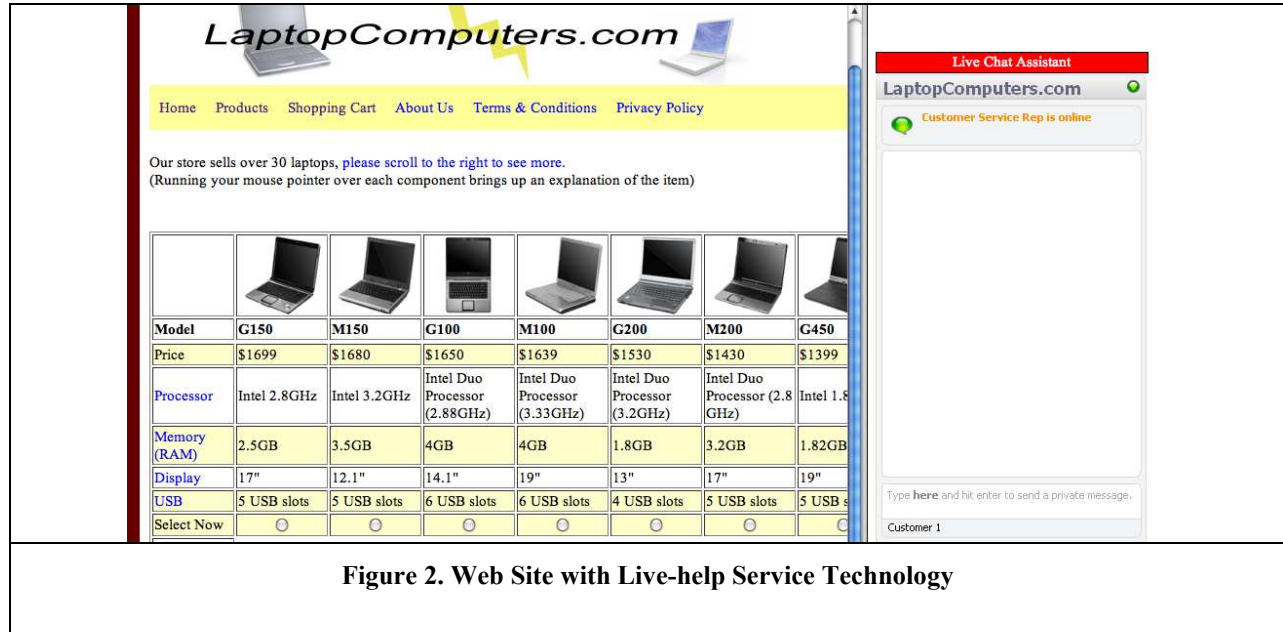


Figure 2. Web Site with Live-help Service Technology

Data Collection Procedures

The subjects were each assigned randomly to one of the four conditions: comparison matrix, software recommendation service technology, live help service technology and hybrid service technology, with 32 individuals assigned to each treatment condition. Each subject was asked to shop for a laptop computer for a friend. We provided each subject with the friend's product requirements. Prior to the study, the subjects were informed that they would each receive \$10 as a reward for their participation. In addition, as in many other experimental studies (e.g., Mao and Benbasat 2000), we offered the top 20 performers an extra amount (\$25) to motivate participants to increase their involvement in the shopping task. We told the participants before the experiment that they would be asked to provide their justifications for their choices and that we would judge their performance based on these justifications.

The measures for perceived service quality, perceived sacrifice, and perceived service outcome were adopted from scales validated in prior studies (see Table 1). We measured perceived service quality with a three-item scale adopted from leading service marketing studies (e.g., Dabholkar et al. 2000; Spreng and Mackoy 1996; Wang et al. 2004), because direct measures of overall service quality serve as better predictors of behavioural intentions than a index of service quality computed from measured dimensions of SERVQUAL (Dabholkar et al. 2000). We adapted measures for perceived sacrifice from scales used in both online and offline contexts (e.g., Brady et al. 2005; Cronin et al. 2000; Kim et al. 2007). This measure was prefaced with the B2C Web site as the target object. Our measure of perceived service outcome has been used both in IS and marketing research (e.g., Jiang and Benbasat 2007; Kempf and Smith 1998). We assessed online customer loyalty as a composite of these three behavioral intentions (Selnes and Hansen 2001; Zeithaml et al. 1996): motivation to continue the relationship, to talk favorably about the supplier,

and to expand the relationship. The two items for product knowledge were developed specifically for this study. Unless otherwise indicated, all measures were based on six-point Likert scales ranging from 0 to 5.

Table 1. Measurement Items for the Constructs

Construct	Items	Sources
Perceived service quality	Overall, the level of service quality I received from the Web site during the laptop selection task is good.	Dabholkar et al. 2000; Spreng and Mackoy. 1996; Wang et al. 2004
	Overall, the level of service quality I received from the Web site during the laptop selection task is excellent.	
	Overall, the level of service quality I received from the Web site during the laptop selection task is high.	
Perceived sacrifice	The Web site let me finish my laptop selection task quickly.	Brady et al. 2005; Cronin et al. 2000; Kim et al. 2007
	Without spending too much time, I was able to select a laptop through the Web site.	
	I was able to get the benefits of the Web site with minimal effort.	
Perceived service outcome	I like the laptop that I have just chosen in the Web site.	Jiang and Benbasat 2007; Kempf and Smith 1998
	I have formed a favorable impression toward the laptop that I have just chosen in the Web site.	
	The laptop that I have just chosen in the Web site is good.	
Online customer loyalty	I will continue to use the website for future purchases.	Selnes and Hansen 2001; Zeithaml et al. 1996
	If a friend asked for my advice, I would recommend the website.	
	If I should be in need of a new laptop computer, I would choose to use the website.	
Customer product knowledge	Compared to an expert, to what degree would you say that you have a good knowledge of attributes (e.g., memory, CPU) of laptop computer?	Developed for this study
	I am familiar with basic computer attributes (e.g., memory, CPU).	

Data Analysis

The 128 subjects³ in the study were recruited in a public university; they were from 14 faculties/schools and over 50 majors, representing very diverse backgrounds. According to a power analysis for the between-subject design, 32 subjects for 4 groups (hence 128 subjects) can assure enough statistical power of 0.80 for a medium effect size ($f = .25$) (Cohen 1988).

Among the 128 subjects, 88 were females and 40 males. Five were nonstudents, 25 were graduate students, and the rest undergraduates. The average age was 23.4. On average, the subjects had been using the Internet for 9.2 years, spending 28.8 hours on the Internet each week. In general, they were familiar with online shopping (5.20/7). The average reported knowledge level of the product used in the task—laptop computers—was 4.42/7.

Tables 2 shows the construct means of the service quality, sacrifice, service outcome, customer loyalty by two levels of product knowledge (low/high) and two levels of live help service (with/without). As product knowledge is a continuous variable, we use a median-split to label the subjects above the median as customers with high product knowledge, and those below the median as customers with low product knowledge.

³ Originally, the hybrid service group had 50 subjects and each of the other three service groups had 32 subjects. Though subjects in the live help group all interacted with the live help, 18 subjects in the hybrid service group did not utilize the live help service. As the exclusion of the 18 subjects did not influence the significance of our results, we excluded them in the subsequent data analysis to maintain an equal sample size of 32 across the four experimental groups.

Table 2. Means for the with/without live help service across low/high customer product knowledge

Dependent Variables/Treatment	Low product knowledge			High Product knowledge		
	Without Live help (n=30)	With live Help (n=32)	Combined (n=62)	Without Live help (n=34)	With live help (n=32)	Combined (n=66)
Service quality	0.92 ^a	2.63 ^b	1.80	1.04 ^a	2.66 ^b	1.82
Sacrifice	1.14 ^a	1.63	1.39	1.27	1.95 ^b	1.60
Service outcome	0.57 ^a	1.28 ^b	0.94	1.05	1.28 ^b	1.16
Customer loyalty	0.96 ^a	2.27 ^b	1.63	1.29 ^a	2.07 ^b	1.67

Note: Different superscripts in the same row indicate that difference between means is significant ($p < 0.05$).

High number in sacrifice represents low actual sacrifice, due to the negative wording of the items.

Test of the Research Model

We analyzed our proposed research model using partial least squares (PLS) structural equation modeling, a component-based approach (Lohmöller 1989). PLS allows the simultaneous testing of the measurement model (the psychometric properties of the scales used to measure a variable) and the estimation of the structural model (the strength and direction of the relationships between the variables). We used the software SMART PLS 2.0 (Ringle et al. 2005) to conduct our analyses. It is based on the same method as PLS-Graph (Chin 2001) and offers similar features with an improved graphical interface.

Measurement model

Assessments of measurement models should examine: (1) individual measurement item reliability, (2) internal consistency, and (3) discriminant validity (Barclay et al. 1995). To support individual item reliability, we examined the loadings of the individual measurement items on their intended constructs and compared these to recommended tolerances of 0.60 or, ideally, 0.70 (Barclay et al. 1995; Chin 1998). All of the measurement items met this latter threshold (Table 3). To support internal consistency of the constructs, we calculated composite reliability and Cronbach's alpha for each construct. All met suggested tolerances (> 0.70 , Fornell and Larcker 1981) with results reported in Table 4.

Table 3. Loading and Cross Loading of Measures

	Perceive service quality	Perceived sacrifice	Perceived service outcome	Online customer loyalty	Customer product knowledge
Perceived service quality1	0.952	-0.535	0.435	0.568	-0.007
Perceived service quality2	0.956	-0.512	0.395	0.567	-0.04
Perceived service quality3	0.973	-0.582	0.381	0.604	-0.02
Perceived sacrifice1	-0.490	0.938	-0.439	-0.623	-0.03
Perceived sacrifice2	-0.453	0.951	-0.389	-0.573	-0.08
Perceived sacrifice3	-0.598	0.822	-0.297	-0.564	0.08
Perceived service outcome1	0.364	-0.404	0.919	0.496	0.061
Perceived service outcome2	0.458	-0.386	0.898	0.425	0.064
Perceived service outcome3	0.343	-0.357	0.938	0.464	-0.022
Online customer loyalty1	0.478	-0.623	0.446	0.932	-0.037
Online customer loyalty2	0.653	-0.635	0.471	0.960	-0.103
Online customer loyalty3	0.583	-0.596	0.521	0.959	-0.075

Customer product knowledge1	0.028	-0.006	0.038	-0.057	0.858
Customer product knowledge2	-0.063	-0.015	0.029	-0.077	0.925

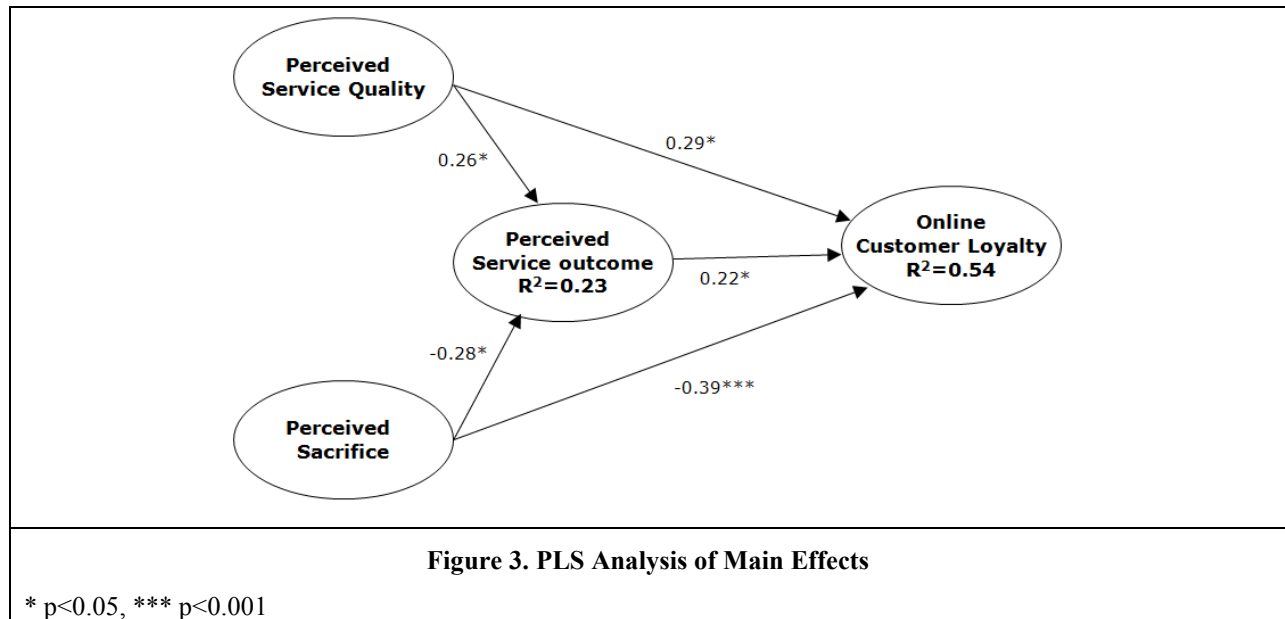
Table 4. Internal Consistency and Discriminant Validity of Constructs

	Composite reliability	Cronbach's alpha	Perceive service quality	Perceived sacrifice	Perceived service outcome	Online customer loyalty	Customer product knowledge
Perceived service quality	0.97	0.96	0.96				
Perceived sacrifice	0.93	0.88	-0.56	0.91			
Perceived service outcome	0.94	0.91	0.42	-0.42	0.92		
Online customer loyalty	0.96	0.95	0.60	-0.65	0.50	0.95	
Customer product knowledge	0.88	0.75	-0.02	-0.01	0.04	-0.08	0.89

Note: Diagonal elements are the square root of AVE. These numbers should exceed the interconstruct correlations for adequate discriminant validity. This condition is satisfied for each construct.

Analysis of Structural model

We next analyzed the structural model to examine the significance and strength of relationships of each of our hypothesized effects. This analysis was done using two PLS models. The first model examined the main effects specified in hypotheses H1 through H5, while the second model added the moderating effects stated in H6 through H8. Results of the analysis for each phase, including standardized path coefficients, path significances, and variance explained (R^2) for each dependent variable, are presented in Figure 3 and Figure 4 respectively.

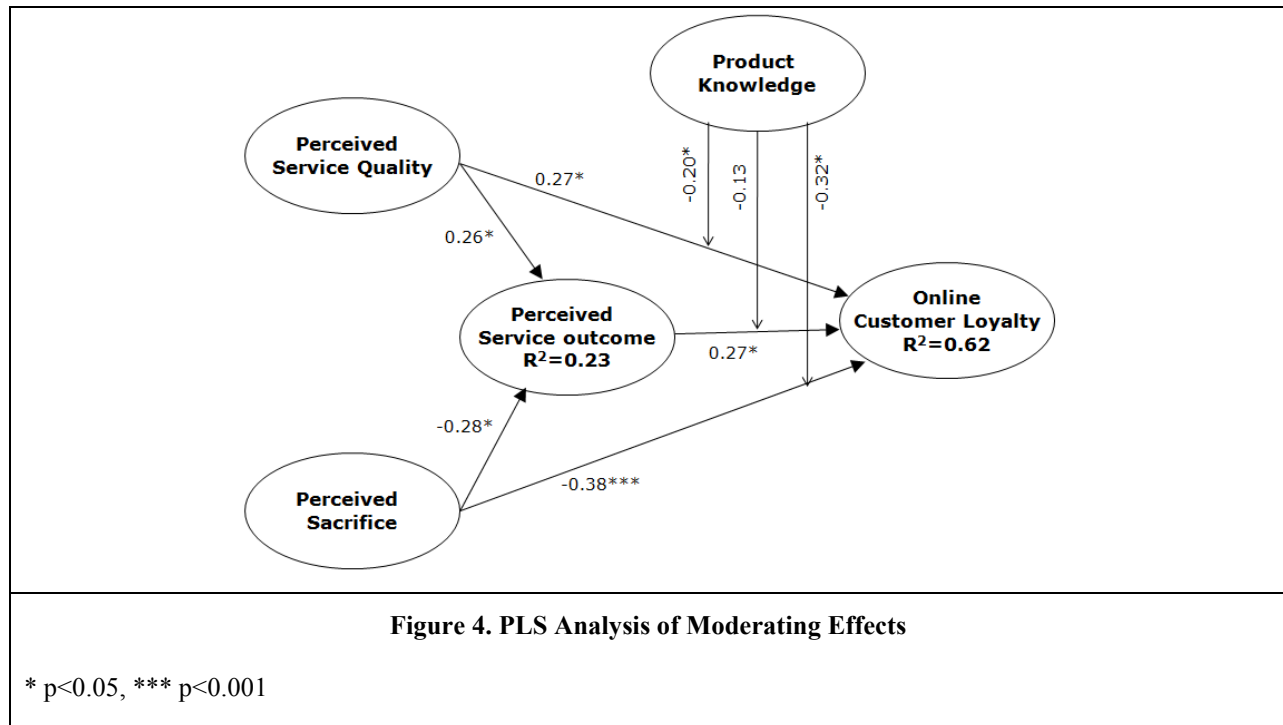


The main effects model (Figure 3) examined the effect of perceived service quality (H1), perceived sacrifice (H2) and perceived service outcome (H3) on online customer loyalty. All three paths in this model were statistically significant. Consistent with the hypothesis, perceived service quality had a significant effect ($\beta = 0.29$; $p < 0.05$) on customer loyalty, thereby supporting H1. Perceived sacrifice had a strong and significant negative effect on customer loyalty ($\beta = -0.39$; $p < 0.001$) providing support for H2. Additionally, customer loyalty was influenced

significantly by perceived service outcome ($\beta = 0.22$, $p < 0.05$). Perceived service quality, perceived sacrifice and perceived service outcome jointly explained 54 percent of the variance in online customer loyalty, with perceived sacrifice contributing a larger proportion to that explanation. Regarding the interaction between service process variables and service outcome variables, both perceived service quality ($\beta = 0.26$, $p < 0.05$) and perceived sacrifice ($\beta = -0.28$, $p < 0.05$) had a significant influence on perceived service outcome, demonstrating support for H4 and H5 respectively. These two service process variables explained 23 percent of the variance in perceived service outcomes.

The moderating effects model (Figure 4) tested the extent to which customer product knowledge moderated the main effects hypothesized in H1 through H3. The interaction terms were modeled in PLS as products of each item belonging to the underlying scales, as recommended by Chin et al. (2003), and added to the main effects model in Figure 4. The main effect of product knowledge on customer loyalty was also included in this model in order to statistically separate the hypothesized moderating effects from all statistically possible main effect (the main effect is not reported here because of its lack of theoretical significance).

As shown in Figure 4, including the moderating effect increased variance explained (R^2) in online customer loyalty from 54 percent in the main effects model to 62 percent in the moderating effects model. Mathieson et al. (2001) described a “pseudo F-test” technique to measure whether the substantive change in the explained variance (R^2) of target variable is statistically significant after the influences of the external variables are taken into account. The effect size (f^2) can be estimated as $(R^2 \text{ full} - R^2 \text{ excluded}) / (1 - R^2 \text{ full})$, where $R^2 \text{ full}$ is the explained variance including the influences of the external variables, and $R^2 \text{ excluded}$ is the explained variance in usage without these external influences. Multiplying f^2 by $(n - k - 1)$, where n is the sample size, and k is the number of independent constructs, provides a pseudo F test for determining whether the f^2 statistic is significant with 1 and $n - k$ degrees of freedom. Using this approach, F-tests (Mathieson et al. 2001) comparing the R^2 for the online customer loyalty between the main and moderating effects models found the increase in explanatory power to be statistically significant at $p < 0.001$. This confirmed our expectation that the hypothesized moderating effects indeed provide superior explanation of customer loyalty over and above their corresponding main effects.



Examining individual paths in the moderating effects model, we found that customer product knowledge had a significant negative moderating effect on the association between perceived service quality and customer loyalty ($\beta =$

-0.20; $p < 0.05$) in accordance with H6. Further, product knowledge positively moderated⁴ the effects of perceived sacrifice on customer loyalty ($\beta = -0.32$; $p < 0.05$) in accordance with H7.

Contrary to expectations, H8 is not significant, indicating that product knowledge did not moderate the association between perceived service outcome and online customer loyalty. Potential reasons for these unexpected effects are explored below.

Discussion

Overall, we found support for seven of the eight hypothesized relationships in our proposed model. Our results support that perceived service quality, perceived sacrifice and perceived service outcome are influential in forming customer loyalty towards online websites supported by service technologies. Our findings also suggest that the effectiveness of the three service attributes on online customer loyalty could be moderated by customer product knowledge.

The finding of positive and significant relationships between service quality and service outcome and online customer loyalty is consistent with the social exchange theory as well as previous research (Bell et al. 2005; Lassar et al. 2000). In addition, the effect of perceived sacrifice on customer loyalty was stronger⁵ than perceived service quality and perceived service outcome, underscoring the importance of including the construct of perceived sacrifice in evaluating customer relationship with online service providers. This suggests that the sacrifice component of the service process (e.g., time and effort spent) is perhaps easier to interpret and therefore more relevant than the service outcome (e.g. how good the laptop is) and service quality in shaping customer loyalty toward the service organization.

Turning to the moderating effects of customer product knowledge, the findings suggest that customers with high product knowledge rely more heavily on low sacrifice than high service quality to signify their customer loyalty. Consistent with the extant literature, customers with high product knowledge tend to be more efficient in their selection and assessment of information (e.g., Eisingerich and Bell 2008), thus, it is reasonable that they will weigh low sacrifice more than high service quality. Conversely, those who possess limited product knowledge rely more on the service quality in determining their intent to stay with the online service provider, and they have to take more time to process and digest the product information. Thus, they weight high service quality over low sacrifice.

The insignificant effect of customer product knowledge regarding service outcome was not expected, as customers with high product knowledge should be able to assess the outcomes associated with the service more confidently, and thus place more weight in determining their loyalty. One possible explanation might be that the service technologies (e.g. software recommendation, live help, and hybrid service) have effectively reduced the product consideration set and freed up customers' cognitive processing capacity so as to evaluate the product alternatives. Thus, the difference between customers with high and low product knowledge in their ability to evaluate service outcome is reduced, which then diminishes the moderation effect. This explanation is evident by observing Table 2, which demonstrates that regardless of customer's product knowledge, customers' perceived service outcome are almost exactly the same when live help service is provided. However, when live help service is absent, customers with high product knowledge perceive a better service outcome than those with low product knowledge.

In addition, Table 2 also indicates that regardless of customers' product knowledge, a website with live help service technology is perceived to have significantly higher service quality than a website without live help service, all other things being equal. This is consistent with the prediction that a customer's overall perceptions of Web site service functionality will increase that customer's perceptions of Web site service quality (Cenfetelli et al. 2008). Live help service is one type of service functionality that provides advice to help customers reach their shopping goals; thus, perceived service quality is increased. As compared to a website without live help service, live help service is in a much better position to interact with customers and handle high-variance customer concerns (Sampson and Froehle 2006). Live help can recognize and accommodate the uniqueness of each customer's requirements, and express personal attention and care, which leads to better perception of service quality, and subsequently online customer loyalty.

⁴ The relationship between perceived sacrifice and customer loyalty are negative. Thus, the negative sign of moderation effect means that product knowledge positively moderates this relationship.

⁵ The total effect of sacrifice is still the strongest when the indirect effects of service quality and sacrifice are taken into account.

Finally, it should be noted that perceived service sacrifice is distinguished from perceived ease of use, which is defined as “the degree to which an individual believes that using a particular system would be free of effort” (Davis 1989), and effort expectancy, which is defined as “the degree of ease associated with the use of the system” (Venkatesh et al. 2003). Thus both perceived ease of use and effort expectancy are a component of perceived sacrifice, which could include perception of effort, time, risk, and monetary aspects (e.g. Brady et al. 2005, Zeithaml 1988). In addition, perceived service outcome is distinguished from satisfaction, which is defined as “an ex post evaluation of customers’ experience with the service and is captured as a positive feeling, indifference, or a negative feeling” (Anderson 1973; Devaraj et al. 2002). In this study, the target of the perceived service outcome is the product choices made by the user rather than the service per se, although both satisfaction and perceived service outcome are closely associated with emotion (Dabholkar and Overby 2005; Johnson et al. 1998).

Contributions, Limitations, Future Research, and Conclusions

Theoretical Contributions

We applied social exchange theory and examined how perceived service quality, perceived sacrifice and perceived service outcome can influence customer loyalty in online websites, particularly those supported with service technologies. We contribute to the social exchange theory by testing it empirically in the online service context enabled by service-based technologies. Looking at the service process by including both perceived service quality and perceived sacrifice, we confirmed the importance of examining the cost side in addition to the benefit side. Most of the existing theories capture factors that measure benefits with the implicit assumption that the user’s response implicitly takes into consideration the costs associated with such behavior⁶. The joint consideration of benefit and cost offer a better understanding of customer’s online behavior. Purchasing online is more a goal-directed behavior (Zeithaml et al. 2002) and goal-directed customers do not want to expend unnecessary sacrifice (Wolfenbarger and Gilly 2001) and are mainly concerned about purchasing products in an efficient and timely manner to achieve their goals with a minimum of irritation (Monsuwe et al. 2004). To fully understand what factors drive online customer loyalty, it is important that future research should not only investigate the benefit side (e.g. service quality) that bring to the customers, but also the potential sacrifice that customers might pay, such as time, effort, price, violation of privacy, and psychosocial risk.

Furthermore, we demonstrate that the service process and outcome are both effective means of improving online customer loyalty. The study indicates how important service process and service outcome are: over half of the variance of customer loyalty is explained primarily through service quality, sacrifice and service outcome that customers perceive. To our knowledge, this is the first paper in that investigates how online customer loyalty can be created by simultaneously considering service outcome and service process represented by both service quality and sacrifice. The sole evaluation of outcome is likely to be adequate when the evaluation target is physical goods or services that are more tangible. In the context of online advice service where advice is more intangible, the consideration of both service process and service outcome is particularly important. Thus, our research underpins the importance of segregating process and outcome elements when the evaluation target is intangible service.

We also contribute to the literature by examining the moderating role of customer product knowledge in influencing the association between the three key service attributes and online customer loyalty. The proposed model explains how the antecedents of customer loyalty vary across individuals. Our findings suggest that perceived service outcome is equally important for customers with either high or low product knowledge, perceived service quality is more important for customers with low product knowledge, yet perceived sacrifice is more important for customers with high product knowledge.

Practical Contributions

The results of this study have important implications for firms, especially within the context of managing online service facilitated by service technologies. Firms often invest tens of thousands of dollars in websites with the goal of generating customer loyalty. Firms can benefit from knowing what service attributes can be shaped to create

⁶ We are thankful to an anonymous reviewer for this observation.

online customer loyalty and under what circumstances these attributes are likely to succeed or fail. This research presents three alternative ways, namely improving perceived service quality, reducing perceived sacrifice, and enhancing perceived service outcome, which firms can employ to create online loyalty customers who in their turn, being more profitable to the vendor, to allow the vendor to outperform competitors with smaller operating expenses. To improve perceived service quality, we recommend practitioners to consider employing live help service technology, given its significant improvement of service quality across customers with either low or high product knowledge.

Additionally, firms should understand that a “one size fits all” approach to create online customer loyalty may not lead to the desired effects, given wide variation in customer product knowledge. Instead, they need to be aware of the various natures of customer perceptions with different product knowledge. In addition to their focus on selling superior service products, firms need to be increasingly oriented toward the customers of those products and the fulfillment of customer needs. Specifically, customers who have low product knowledge are influenced more by service quality, while those with high product knowledge are more likely to rely on less sacrifice. Targeting a customer group with the wrong type of service attributes may be counterproductive. Thus, providing live help service would be more influential for customers with low product knowledge, because live help service can improve service quality and more likely lead to customer loyalty than customers with high product knowledge. Another reason is that live help service can boost perceived service outcome for customers with low product knowledge but not those with high product knowledge.

Limitations and Future Research

The limitations and the possible future research suggestions are as follows. First, the parsimony of our proposed model suggests that some additional variables might help explain key variables and moderate the strength relationships within the model. For example, product category and cultural element might also influence the impact of the main service attributes. Second, we focus only on the requirement and specification service stage of the CSLC. However, we believe that this service stage is the most important one where customers need service most, and the result has implications for other services as well. Further research might be necessary to confirm whether results from other service stages of the customer life cycle will be comparable with the current study. Third, we did not find that product knowledge moderates the relationship between perceived service outcome and customer loyalty. One likely reason is due to the small sample size and lack of statistical power. Future research is necessary to test this moderating effect with larger sample size. In addition, our operationalization of perceived sacrifice focus on time and effort perception. The next step is to broaden the operationalization of sacrifice to include financial and psychological sacrifice in the online service context. Finally, we used text-based live help to implement live help service, as it is considered more efficient and cheaper than voice-based live help (Gilbert and Berson 2003). However, other kinds of live help service deserve further research attention to determine whether the current study results still hold.

Conclusions

Applying social exchange theory, we posit that service outcomes and two aspects of service process, perceived service quality and perceived sacrifice, influence online customer loyalty. The results supported these propositions in the online service context. Based on the cost-benefit paradigm and concept of service value, we separate the evaluation of service process into service quality and sacrifice. In addition, we highlight the importance of the simultaneous consideration of service process and service outcome in evaluating online service. Furthermore, we found that customer product knowledge negatively moderates the effect of perceived service quality, and positively moderates the effect of perceived sacrifice, on online customer loyalty.

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